

Remarks

Claims 1-11, 16, 17, 19, 21-28, 34-37, 44-53, 55-76 and 85-91 are pending.

Claims 19 and 29-32 have been canceled as being drawn to unelected species. Applicant reserves the right to file one or more divisional applications based on these claims.

Claims 21 and 65 have been amended, and new Claims 89-91 have been added. No new matter has been added.

Support for the amendment to Claim 21 ("one or more") is in the specification at page 12, lines 14-17 (....It is contemplated that a plurality of stiffeners can be disposed on lead frame 6 of lead frame assembly 24. Further, each of the plurality of stiffeners can comprise various configurations (e.g., size and/or shape)...).

Support for new Claim 89 is in Claims 16 and 28, which the Examiner has indicated are allowable upon amendment. Additional support is in FIG. 3 as described at page 10, lines 9-10 of the specification.

Support for new Claim 90 is provided, for example, in pending Claims 24, 35 and 55.

Support for new Claim 91 is in Claim 36.

Status of claims. Regarding Claim 36, the Examiner had indicated that this claim was *withdrawn* but has now set forth a reasoned examination of this claim based on the combination of Johnson with Hofsee, as set forth in the Office Action at page 10 (¶ 2). Therefore, it is assumed that Claim 36 is *no longer withdrawn*.

The allowability of Claims 16 and 28 upon amendment is acknowledged.

Election/Restrictions

The Examiner argues that cancellation of non-elected claims 19, 21-22, 25-27, 29-32, 36 and 51-53 is required. The Examiner is mistaken.

The claims at issue are non-elected species – resulting from the Examiner's restriction based on species. The Examiner is respectfully directed to the Office Action mailed September 8, 2005, and particularly to page 3, where the Examiner stated as follows (emphasis added):

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable

thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

There is no requirement to cancel the non-elected claims.

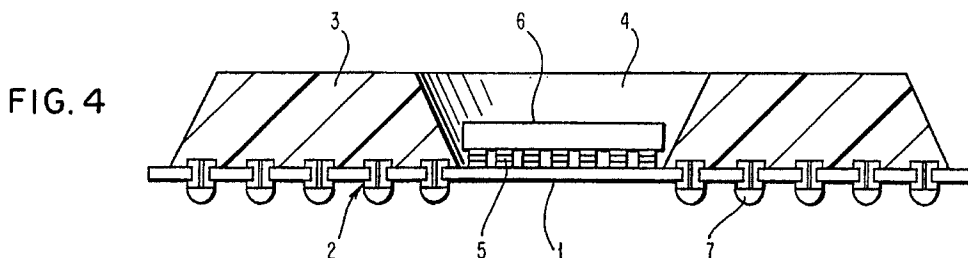
The restriction was based upon an election of species and, upon allowance of a generic claim, Applicant will be entitled to consideration of claims to additional species that depend from or otherwise include all limitations of an allowable generic claim.

Accordingly, the withdrawn claims are hereby maintained.

Rejection of Claims under 35 U.S.C. §§ 102(b) (Johnson)

The Examiner rejected Claims 1, 2, 10, 11, 17, 24, 34, 35, 37, 44-47, 49, 50, 62-65, 68-70, 74-76 and 85-88 under Section 102(b) as anticipated by Johnson (USP 5,888,849). This rejection is respectfully traversed.

The Examiner argues that Johnson discloses each of the elements of the rejected claims, citing particularly to Fig. 4 (shown below) and col. 3.



The Examiner is mistaken.

Each of the claims at issue requires a plurality of stiffener components.

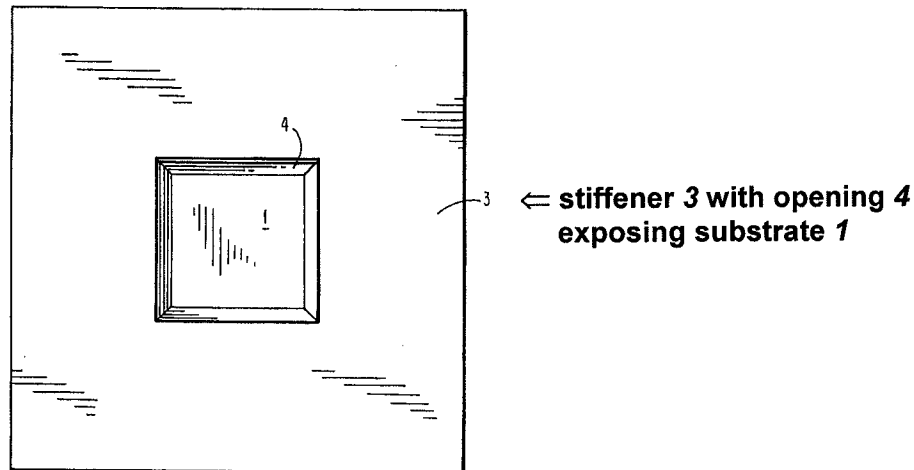
In contrast, Johnson teaches a stiffener 3 which is a single continuous, plate-like structure applied to a substrate 1 that includes an opening 4 for mounting a die/chip 6 onto the substrate 1.

See Johnson at col. 3, lines 9-13.

FIG. 4 illustrates a flip-chip BGA application of the present invention. Subsequent to providing the molded stiffener 3, the semiconductor 6 is positioned within the opening 4 in the molded stiffener and is electrically connected or coupled to electrical circuitry on the film 1. ...

Johnson's **Fig. 8** illustrates a top view of the molded device showing the single stiffener **3** with opening **4**.

FIG. 8



This construction of a *single* stiffener **3** on a substrate **1** with an *opening* **4** is further emphasized by Johnson in the following sections (emphasis added). (See also Claim 1.)

In the Abstract:

An electronic package is fabricated by providing a thin, circuitized substrate having electrical circuitry on a first surface; and then molding *a dielectric body* to the first surface of the substrate. *The dielectric body contains an opening* for exposing a portion of the surface of the thin circuitized substrate having at least a portion of the electrical circuitry. *A semiconductor device is then positioned within the opening of the molded dielectric body ...*

At col. 1, lines 55-62:

The present invention provides a method for forming an electronic package that overcomes above discussed problems in the prior art concerning attachment of the stiffener means to the thin, flexible film layer. ...More particularly, the method of the present invention involves providing a thin, circuitized substrate having electrical conductivity on a first surface thereof. Next, *a dielectric body* is molded to the first surface of the thin circuitized substrate. *The dielectric body includes an opening therein* to thereby expose a portion of the surface of the thin circuitized substrate having at least part of the electrical circuitry thereon.

Thereafter, the method of the present invention includes *positioning a semiconductor device within the opening in the molded dielectric body*

Johnson fails to teach a *plurality* of components attached to a substrate as defined by Applicant's claims, and thus cannot anticipate the claims.

Nor is there any suggestion to substitute a plurality of components for Johnson's single plate-like stiffener. Johnson teaches a single stiffener **3** that is formed over the upper surface of the substrate **1** in the form of a plate with a single opening **4** provided for mounting a die/chip **6** onto the surface of the substrate **1**.

Accordingly, the Examiner is respectfully requested to reconsider and then withdraw this rejection of the claims.

Rejection of Claims under 35 U.S.C. §§ 103(a) (Johnson)

The Examiner rejected Claims 3-8 under Section 103(a) as obvious over Johnson. This rejection is respectfully traversed.

The Examiner argues that the rejected claims are obvious in view of Johnson.

Claims 3-8 depend from and include all of the limitations set forth in Claim 1.

For the reasons stated above with respect to the failure of Johnson to teach or suggest Applicant's devices as claimed, the formation of the substrate **1** and/or stiffener **3** in Johnson's device with a thickness as defined in depending Claims 3-8 does not correct the deficiencies of Johnson's teachings and would not result in Applicant's devices as claimed.

Accordingly, the Examiner is respectfully requested to reconsider and then withdraw this rejection of the claims.

Rejection of Claims under 35 U.S.C. § 103(a) (Johnson/McMillan)

The Examiner rejected Claims 9, 55, 56 and 67 as obvious over Johnson in view of McMillan (USP 5,650,593).

At paragraph 4, the Examiner further rejected Claims 66, 69-71 and 76 as obvious over Johnson in view of McMillan.

These rejections are respectfully traversed.

The Examiner argues that it would be obvious to modify Johnson's devices to form the stiffener a) from a thermoplastic, and b) by injection, transfer or spray molding, and curing processes, based on McMillan.

For the reasons stated above with respect to the failure of Johnson to teach or suggest Applicant's devices as claimed, the formation of the stiffener in Johnson's device with a

thermoplastic material or by the cited processes does not correct the deficiencies of Johnson's teachings and would not result in Applicant's device or methods as claimed.

As discussed above, Johnson fails to disclose forming a plurality of stiffeners on a substrate. Rather, Johnson teaches forming a single, unitary plate-like stiffener on to a substrate with an opening for mounting a die onto the underlying substrate.

Similarly, McMillan teaches a single component – casing 217 (Fig. 6) on a substrate, which is a continuous structure in the form of a *dam* to contain encapsulant within the walls 222.

The Examiner's proposed modification of Johnson in view of McMillan does not teach or suggest Applicant's devices or methods as claimed.

Furthermore, the Examiner's reasoning (at page 13) as to Claim 76 is in error. Claim 76 does not recite "two or more compartments for receiving dies." Rather, Claim 76 is directed to the method of Claim 67 – "further comprising *encapsulating* at least a portion of the die."

Johnson in combination with McMillan does not teach or suggest Applicant's devices or methods as claimed. Accordingly, the Examiner is respectfully requested to reconsider and then withdraw this rejection of the claims.

Rejection of Claims under 35 U.S.C. § 103(a) (Johnson/Hofsee)

At page 10(¶ 2), the Examiner rejected Claims 36 and 76 as obvious over Johnson in view of Hofstee (USP 6,541,847).

At page 10(¶ 3), the Examiner rejected Claims 48-50 as obvious over Johnson in view of Hofstee.

These rejections are respectfully traversed.

Applicant reserves the right to swear behind Hofstee, which was filed February 4, 2002 (versus Applicant's filing date of February 15, 2002).

Regarding Claim 36, the Examiner had indicated that this claim was *withdrawn* but has now examined this claim based on the combination of Johnson with Hofsee. Therefore, it is assumed that Claim 36 is *no longer withdrawn*.

The Examiner argues that it would be obvious to modify Johnson's device based on Hofsee to form the stiffener *on the second side/surface* of the substrate.

The Examiner is mistaken. Johnson expressly teaches that the molded plastic should be applied to only one surface/side of the substrate and that it is essential not to apply any plastic material to the second surface of the substrate 1. See Johnson at col. 2, lines 37-47 (emphasis added).

FIG. 2 illustrates clamping the flexible circuit 1 between the lower 9 half and upper 11 half of the mold with cavity 12. *The plastic molding composition is then directly provided in the cavity 12 and to only one side, in the example shown, the top side, of flexible circuit 1. It is essential to the practice of the present invention that the plastic mold material be applied to only one of the major surfaces of the flexible circuit 1.* Otherwise, material provided on the other major surface of the film has a tendency to reduce the available area for connection to integrated circuit boards or chips, such as through BGA (solder balls).

Therefore, Johnson teaches away from forming a second stiffener on a second surface/side of the substrate. Accordingly, contrary to the Examiner's argument, one skilled in the art reading Johnson's disclosure would not modify Johnson's device as defined in Claim 36.

Regarding method claims 48-50 and 76, the Examiner maintains that it would be obvious to modify Johnson's method based on Hofsee to a) singulate the assembly, and b) encapsulate dies on the device.

For the reasons stated above with respect to the failure of Johnson to teach or suggest Applicant's devices as claimed, the inclusion of either a singulation or encapsulation step in Johnson's methods would not result in Applicant's methods as claimed.

As discussed above, Johnson fails to disclose forming a plurality of stiffeners on a substrate. Rather, Johnson teaches forming a stiffener on a substrate in the form of a single unitary plate that includes an opening for mounting a die onto the underlying substrate.

Similarly, Hofstee teaches a single unitary plate-like stiffener applied to a substrate that includes openings for mounting dies onto the underlying substrate. See, for example, stiffeners 125, 126 in Figs. 5-6, stiffeners 25, 26 in Figs. 2-3, and stiffeners 225, 226 in Figs. 8-9.

The Examiner's proposed modification of Johnson in view of Hofsee does not teach or suggest Applicant's devices or methods as claimed.

Accordingly, the Examiner is respectfully requested to reconsider and then withdraw this rejection of the claims.

Rejection of Claims under 35 U.S.C. § 103(a) (Johnson/Gregory)

The Examiner rejected Claims 23 and 60 as obvious over Johnson in view of Gregory (USP 4,710,419). This rejection is respectfully traversed.

[In the Office Action at page 14, the Examiner cited to MacDonald rather than Johnson as the primary reference, and to "APA". It is assumed that this is a typographical error.]

The Examiner cites to Gregory for disclosing a substrate 30 in a form of a reel (Figs. 2-7).

For the reasons stated above with respect to the failure of Johnson to teach or suggest Applicant's devices as claimed, the modification of the substrate of Johnson into the form of a reel would not result in Applicant's devices as claimed.

As discussed above, Johnson fails to disclose a *plurality* of stiffeners on a substrate. Rather, Johnson teaches a *single, unitary plate-like stiffener* applied to a substrate that includes an opening for mounting a die onto the underlying substrate.

Accordingly, the Examiner is requested to reconsider and withdraw this rejection of the claims.

Extension of Term.

The proceedings herein are for a patent application and the provisions of 37 CFR § 1.136 apply. Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that Applicant has inadvertently overlooked the need for a petition for extension of time. If any extension and/or fee are required, please charge Account No. 23-2053.

It is respectfully submitted that the claims are in condition for allowance and notification to that effect is earnestly solicited.

Respectfully submitted,



Kristine M. Strodthoff
Reg. No. 34,259

Dated: February 14, 2011

WHYTE HIRSCHBOECK DUDEK S.C.
555 East Wells Street,
Suite 1900
Milwaukee, Wisconsin 53202-3819
(414) 273-2100
Customer No. 31870